Image

00684.002700.1

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	:	Examiner: P. B. Kim
Yasuyuki UNNO	)	
	:	Group Art Unit: 2851
Application No.: 09/523,735	)	
	:	Confirmation No.: 7033
Filed: March 13, 2000	)	
	:	
For: PROJECTION OPTICAL SYSTEM AND PROJECTION EXPOSURE APPARATUS HAVING THE SAME	)	January 29, 2004
	:	
	)	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Transmitted herewith is a Request for Reconsideration in the above-identified application.

[X] No additional fee is required.

The fee has been calculated as shown below:

CLAIMS AS AMENDED						
	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NO. PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE	ADDITIONAL FEE
TOTAL CLAIMS	32	MINUS	34	= 0	x $9 $18	$0.00
INDEP. CLAIMS	4	MINUS	4	= 0	x $42 $84	$0.00
Fee for Multiple Dependent claims $140/$280						—
			TOTAL ADDITIONAL FEE FOR THIS AMENDMENT			$0.00

[ ] °Verified Statement claiming small entity status is enclosed, if not filed previously.

☐ A check in the amount of $_____ is enclosed.

☐ Charge $____ to Deposit Account No. 06-1205. A duplicate of this sheet is enclosed.

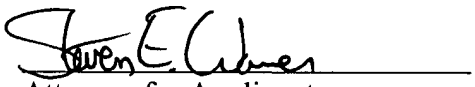
☒ Any prior general authorization to charge an issue fee under 37 CFR 1.18 to Deposit Account No. 06-1205 is hereby revoked. The Commissioner is hereby authorized to charge any additional fees under 37 CFR 1.16 and 1.17 which may be required during the entire pendency of this application, or to credit any overpayment, to Deposit Account No. 06-1205. A duplicate of this paper is enclosed.

☐ A check in the amount of $_____ to cover the fee for a _____ month extension is enclosed.

☐ A check in the amount of $____ to cover the Information Disclosure Statement fee is enclosed.

☒ Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our address given below.

Respectfully submitted,



Attorney for Applicant
Steven E. Warner
Registration No. 33,326

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-3801
Facsimile: (212) 218-2200
SEW/eab

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REQUEST FOR RECONSIDERATION

Sir:

In response to the Office Action issued October 29, 2003, Applicant requests favorable reconsideration and allowance of the subject application in view of the following remarks.

Claims 11, 12, 14-16, 18-20, 22 and 24-46 are presented for consideration. Claims 11, 18 27 and 28 are independent.

Applicant requests favorable reconsideration and withdrawal of the rejections set forth in the above-noted Office Action.

Claims 11, 12, 18, 20, 27, 28, 30, 32, 34-37 and 43-46 were rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,986,733 to Winker et al. in view U.S. Patent No. 5,677,755 to Oshida et al. Claims 19, 26, 29, 40 and 42 were rejected under 35 U.S.C. § 103 as being unpatentable over the original art combination and further in view of U.S. Patent No. 5,892,573 to Takahashi et al. Claims 16, 24, 25, 31 and 33 were rejected under 35 U.S.C. § 103 as being unpatentable over the original art combination and further in view of U.S. Patent No. 6,055,053 to Lesniak. Claim 41 was rejected under 35 U.S.C. § 103 as being unpatentable over the art combination immediately above and further in view of the Takahashi et al. patent. Claims 14, 15, 22, 38 and 39 were rejected under 35 U.S.C. § 103 as being unpatentable over the original art combination and further in view of the Aoyama et al. article. Applicant submits that the cited art, whether taken individually or in combination, does not teach many features of the present invention as recited in the pending claims. Therefore, these rejections are respectfully traversed.

In one aspect of the invention, independent claim 11 recites a projection optical system that includes a plurality of lenses that cause birefringence and at least one optical element for substantially eliminating the birefringence caused by the plurality of lenses. The at least one optical element is disposed between the plurality of lenses and an image plane of the projection optical system.

In another aspect of the invention, independent claim 18 recites a projection exposure apparatus that includes an illumination system for illuminating a reticle with light and a projection optical system for projecting a pattern of the reticle onto a wafer. The projection optical system includes those features discussed above with respect to independent claim 11.

In still another aspect of the invention, independent claim 27 recites a projection optical system that includes a plurality of lenses that cause birefringence and at least one optical element for substantially eliminating the birefringence caused by the plurality of lenses. The at least one optical element is disposed near a pupil of the projection optical system.

In yet another aspect of the invention, independent claim 28 recites a step-and-scan type projection exposure apparatus that includes an illumination system for illuminating a reticle with light and a projection optical system for projecting a pattern of the reticle onto a wafer. The projection optical system includes those features discussed above with respect to independent claim 27.

Applicant submits that the cited art, whether taken individually or in combination, does not teach or suggest such features of the present invention, as recited in independent claims 11, 18, 27 and 28.

The Winker et al. patent relates to a normally white liquid crystal display that includes polarizer and analyzer layers having perpendicular absorbing axes. Specifically, the display includes a liquid crystal that is sandwiched between compensator layers, with the compensator layers being sandwiched between a polarizer and an analyzer. Thus, the liquid crystal layer is disposed between the polarizer layer and the analyzer layer with its director exhibiting an azimuthal twist through the layer. First and second electrodes are proximate to first and second major surfaces of the liquid crystal layer. A first negatively birefringent compensator layer, oriented with its optical axis substantially parallel to the average direction of the optical axis within a central region of the liquid crystal layer in its driven state, is disposed between the polarizer layer and the liquid crystal layer. A second negatively birefringent compensator layer,

with a birefringence substantially the same as the birefringence of the first compensator layer and oriented with its optical axis substantially parallel to the optical axis of the first compensator layer, is disposed between the analyzer layer and the liquid crystal layer.

The Oshida et al. document relates to a pattern exposure method that includes steps of irradiating a mask or reticle having a desired original pattern written thereon with light with a desired directivity from an illuminating light source for exposure, and projecting transmitted or reflected light from the mask onto an object to be exposed through a projection optical system. A pattern-dependent polarizing mask gives polarization characteristics in compliance with the direction of the pattern on the mask to the illuminating light transmitted through the pattern. A pattern exposure apparatus includes illuminating light for exposure, a mask or a reticle, an illumination optical system for irradiating the mask with light emitted from the light source and a projection optical system for projecting the transmitted or reflected light from the mask onto the object to be exposed. This apparatus also includes a polarizing unit for polarizing the illuminating light on the pupil of the projection optical system so as to be nearly rotationally symmetric with respect to the center of the pupil when the mask is not used. Further, a mask, used with the pattern exposure apparatus, gives pattern-dependent polarization characteristics.

The Examiner takes the position that it would have been obvious to one having ordinary skill in the art to provide a birefringence correction plate layer such as discussed in the Winker et al. patent, between lenses on an image plane or a pupil plane of the projection exposure apparatus shown in the Oshida et al. patent. This assertion is respectfully traversed.

The Winker et al. merely shows a birefringence correction plate layer in a liquid crystal cell. That patent does not at all teach or suggest using such a correction plate in a projection exposure apparatus, as suggested by the Examiner.

Further, the Oshida et al. patent does not at all teach or suggest an optical system having a liquid crystal cell in the manner taught in the Winker et al. patent. Further, the Oshida et al. patent does not teach or suggest anything regarding birefringence in a projection exposure apparatus.

Applicant submits, therefore, that there is absolutely no teaching or suggestion in either the Winker et al. patent or the Oshida et al. patent that would provide the requisite motivation to one having ordinary skill in the art to combine the cited patents in the manner suggested in the above-noted Office Action. In this regard, it is well settled that the mere fact that teachings found in the prior art could be combined as proposed by the patent Examiner, does not make the combination obvious to one having ordinary skill in the art, absent some teaching, suggestion, or incentive supporting the proposed combination. In the instant application, Applicant submits that the Examiner has failed to identify any such teaching, suggestion or incentive to support the proposed combination of the two prior art patents in the manner suggested in the Office Action. *See* Ex Parte Metcalf, Board of Patent Appeals and Interferences (Unpublished Opinion, May 2, 2003, as reported in the USPQ2d, Vol. 67, No. 8, p. 1633).

In this regard, the Oshida et al. patent is completely silent with respect to birefringence in an optical system of the exposure apparatus. Specifically, birefringence is not at issue in the Oshida et al. patent at all. This is true whether or not birefringence may be inherent to every lens or optical system, as suggested by the Examiner. Accordingly, Applicant submits that one

having ordinary skill in the art would not read the Oshida et al. patent as being concerned about birefringence. Since the Oshida et al. patent is far removed from any concern about birefringence, Applicant submits that one having ordinary skill in the art would not think of introducing any optical element (whether or not it corrects birefringence), as suggested by the Winker et al. patent, into the exposure apparatus of the Oshida et al. patent.

Applicant respectfully submits that the Examiner is relying on Applicant's own disclosure as a road map to support such a combination. In other words, the Examiner is resorting to invidious hindsight reconstruction in order to make this combination. In short, therefore, this combination rejection is not well founded. Applicant submits that there is nothing in the cited art which supports the position that it can be combined in the manner suggested. Even if the art could be so combined, the mere fact that the art can be combined is not sufficient if there is no suggestion in the art that such a combination is desirable. For example, *see ACS Hospital Systems Inc. v. The Montefiore Hospital*, 221 USPQ 929, 933 (Fed. Cir. 1984) which states that:

> Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under Section 103, teachings of references can be combined only if there is some suggestion or incentive to do so. The prior art of record fails to provide any such suggestion or incentive. (Emphasis in the original).

Moreover, Applicant submits that even if the Oshida et al. patent and the Winker et al. patent were considered in combination, that combination fails to teach or suggest the salient features of Applicant's present invention of providing a birefringence correcting element at the pupil of a projection optical system or between an image plane and lenses of the projection optical system. In this regard, even though the Oshida et al. patent mentions something about the

position of a polarizing element, this suggestion teaches nothing about the positioning of a birefringence correcting element, more particularly, placing a birefringence correcting element at the pupil plane or between a projection lens and an image plane, in the manner of the present invention recited in the independent claims.

For the reasons noted above, Applicant submits that there is not incentive or motivation to combine the cited art in the manner proposed by the Examiner in the above-noted Office Action. Applicant further submits that even if the art were so combined, Applicant's present invention recited in the independent claims would not result.

Still further, the Examiner relies on two very old cases, notably *In re McLaughlin*, 170 USPQ 209 and *In re Bozek*, 163 USPQ 545. The latter case was summarily dismissed in *In re Sang-Su Lee*, 61 USPQ 2d 1430 (Fed. Cir. 2002). In that case, the court stated that "[n]or does *Bozek*, after 32 years of isolation, outweigh the dozens of rulings of the Federal Circuit and the Court of Customs and Patent Appeals that determination of patentability must be based on evidence." *Id.* at 1435. Evidence in this case meant evidence in the prior art as opposed to common knowledge and common sense. Applicant respectfully submits that there is insufficient evidence in the prior art to formulate the obviousness rejections asserted by the Examiner.

Applicant further submits that the remaining art cited does not cure the deficiencies noted above with respect to the Winker et al. patent and the Oshida et al. patent.

The Examiner relies on the Takahashi et al. patent for teaching illumination of a reticle with slit-like light and scanning a wafer and the reticle at a speed ratio corresponding to the magnification. The Examiner relies on the Lesniak patent for teaching an optical system which exhibits birefringence due to a stress distribution and the Aoyama et al. article for teaching that

form birefringence is produced using ultra-high spacial frequency gratings with a period smaller than the wavelength used.

Applicant submits, however, that none of these remaining citations teaches or suggests the salient features of Applicant's present invention as recited in the independent claims, which have been discussed above. Therefore, those citations add nothing to the teachings of the Winker et al. patent or the Oshida et al. patent that would render obvious Applicant's present invention recited in the independent claims.

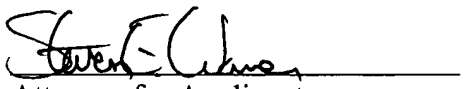
For the foregoing reasons, Applicant submits that the present invention, as recited in independent claims 11, 18, 27 and 28, is patentably defined over the cited art, whether that art is taken individually or in combination.

Dependent 12, 14-16, 19, 20, 22, 24-26 and 29-46 should be deemed allowable, in their own right, for defining other patentable features of the present invention in addition to those recited in their respective independent claims. Individual consideration of these dependent claims is requested.

Applicant further submits that the instant application is in condition for allowance. Favorable reconsideration, withdrawal of the rejections set forth in the above-noted Office Action and an early Notice of Allowance are requested.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our address listed below.

Respectfully submitted,



Attorney for Applicant
Steven E. Warner
Registration No. 33,326

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-3801
Facsimile: (212) 218-2200

SEW\eab

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